Xs SERIES

Xs 4300

AC Power Draw and Thermal Dissipation

This document provides detailed information about the amount of power and current drawn from the AC mains by the Crown® Xs 4300 amplifier and the amount of heat produced under various conditions. The calculations presented here are intended to provide a realistic and reliable depiction of the amplifiers. The following assumptions or approximations were made:

- The amplifier's available channels are loaded, and full power is being delivered.
- Efficiency at standard 1 kHz power into 4 ohms is 55.5%.
- Quiescent power draw is 38.1 W.
- The estimated duty cycles take into account the typical crest factor for each type of source material.
- Duty cycle of pink noise is 50%.
- Duty cycle of highly compressed rock 'n' roll midrange is 40%.
- Duty cycle of rock 'n' roll is 30%.
- Duty cycle of background music is 20%.
- Duty cycle of continuous speech is 10%.
- Duty cycle of infrequent, short duration paging is 1%.

Here are the equations used to calculate the data presented in Figure 1:

$$\text{AC Mains Power Draw (watts)} = \frac{\text{Total output power with all channels driven (watts)} \times \text{Duty Cycle}}{\text{Amplifier Efficiency}} + \text{Quiescent and Fan Power Draw (watts)}$$

The quiescent power draw of 90 watts is a maximum value and includes power drawn by the fan. The following equation converts power draw in watts to current draw in amperes:

$$\text{Current Draw (amperes)} = \frac{\text{AC Mains Power Draw (watts)}}{\text{AC Mains Voltage} \times \text{Power Factor}}$$

The value used for Power Factor is 0.83. The Power Factor variable is needed to compensate for the difference in phase between the AC mains voltage and current. The following equation is used to calculate thermal dissipation:

$$\text{Thermal Dissipation (btu/hr)} = \left(\frac{\text{Total output power with all channels driven (watts)} \times \text{Duty Cycle} \times \text{Amplifier Inefficiency}}{\text{Amplifier Efficiency}} + \text{Quiescent and Fan Power Draw (watts)} \right) \times 3.415$$

The value used for inefficiency is 0.35 (1.00–0.65). The factor 3.415 converts watts to btu/hr. Thermal dissipation in btu is divided by the constant 3.968 to get kcal. If you plan to measure output power under real-world conditions, the following equation may also be helpful:

$$\text{Thermal Dissipation (btu/hr)} = \left(\frac{\text{Total measured output power from all channels (watts)} \times \text{Amplifier Inefficiency}}{\text{Amplifier Efficiency}} + \text{Quiescent and Fan Power Draw (watts)} \right) \times 3.415$$

Xs 4300

	LOAD														
	2 Ohm Stereo					4 Ohm Stereo					8 Ohm Stereo				
Duty Cycle	AC Mains Power Draw (W)	Current Draw (Amps)		Thermal Dissipation		AC Mains Power Draw (W)	Current Draw (Amps)		Thermal Dissipation		AC Mains Power Draw (W)	Current Draw (Amps)		Thermal Dissipation	
		120V	230V	btu/hr	kcal/hr		120V	230V	btu/hr	kcal/hr		120V	230V	btu/hr	kcal/hr
50%						1119	14.3	7.5	1773	447	759	9.7	5.1	1225	309
40%						903	11.6	6.0	1444	364	615	7.9	4.1	1006	254
30%						687	8.8	4.6	1116	281	471	6.0	3.1	787	198
20%						471	6.0	3.1	787	198	326	4.2	2.2	568	143
10%						254	3.3	1.7	459	116	182	2.3	1.2	349	88

Figure 1 Power Draw, Current Draw and Thermal Dissipation at Various Duty Cycles

A Harman International Company

Crown International, Inc.
P.O. Box 1000
Elkhart, IN 46515-1000
TEL: 574-294-8200
FAX: 574-294-8FAX
www.crownaudio.com

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